The occupational attractiveness of the built environment and the roles of individualism and collectivism: a hidden source of conflict and gender imbalance?

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Abstract

The success of built environment projects is closely dependent on strong collective cooperation. Yet abundant anecdotal and academic evidence attests to weak collective cooperation within the industry. To date, no research in the built environment has investigated either the individual-level differences in individualism/collectivism that affect cooperativeness, or how gender may interact with these individual-level traits. In this research we seek to make a positive contribution by using the individual rather than organization as the unit of analysis. We first test the possibility that the built environment may in fact attract uncooperative individuals who are more individualistic than collectivist with respect to two specimen subsectors, i.e. construction management and architecture. At the same time we also employ a nuanced distinction between horizontal and vertical facets of individualism/collectivism, and assess potential interactions with gender. Using individual-level data (N¼548), we find that both the architecture and construction management subsectors are occupationally attractive to individuals from opposing ends of the horizontal and vertical individualism/collectivism spectrums, and that these traits interact with gender. We argue that our findings both expose an individual-level source of poor collective cooperation in the built environment industry, and underscore the need to address persistently low female recruitment and retention rates.

Keywords: Occupational attractiveness, Individualism, Collectivism, Cooperation, Gender imbalance, Construction management, Architecture, Human Resource Management

Introduction

This paper examines whether the personality types intrinsically attracted to the built environment may help address the two critical goals within the industry: namely reducing intra- and inter-organizational conflict and raising the level of female participation. This is performed by assessing individual data on how the perceived attractiveness of two specimen built environment subsectors (i.e. construction management and architecture) relates to, firstly, the extent of individualist

and collectivist personality dimensions categorized according to vertical or horizontal orientations, and secondly, the interactions of these personality divisions with respect to gender.

As the multi-party nature of construction projects is characterized by dynamic and transient collaborations of different project teams (Cherns and Bryant 1984, Lansley 1994, Oswald *et al.* 2018), there is a constant need for high-levels of intra- and inter-party collective cooperation. Despite this need, the built environment sector is often characterized by low collective cooperation, with disputes and poor conflict management having a noted detrimental effect on value, safety, profitability, and client satisfaction (Latham 1994, Gardiner and Simmons 1995, Bresnen and Marshall 2000, Egan 1998, Phua 2004, Atkinson and Westall 2010). As the scale and complexity of many built environment projects has grown, so too has the need for collective cooperation, yet organizational disputes have instead risen in frequency (Whitfield 2012, p. 2), with suboptimal levels of collective cooperation and ensuing disputes increasingly implicated in inferior project performance (Kennedy *et al.* 1997, Masrom *et al.* 2013, Zhang and Huo 2015).

Low collective cooperation and the conflictual nature of the built environment sector have not just been cited as causes of inferior project performance, they have also been associated with the unattractiveness of the sector to females (Gale 1992, Dainty *et al.* 2000, 2004, Loosemore and Galea 2008). Low built environment industry occupational attractiveness to females has frequently been highlighted as a problem simply because it means, of course, the sector is largely confined to drawing only on the male-half of the potentially available talent pool (Sommerville *et al.* 1993, Fielden *et al.* 2000, Arditi *et al.* 2013) However, a relative lack of females being attracted into the built environment industry due to low collective cooperation and associated high disputational conflict means the sector is also, as a result, failing to attract a proven source of greater collective cooperation and diminished disputational conflict: female workers themselves (Eagly and Carli 2003, Nielsen and Huse 2010, English and Hay 2015, Pletzer *et al.* 2015). Hence the low occupational attractiveness of the built environment industry to females could simultaneously be not just an effect, but a cause of poor collective cooperation in the sector.

Ultimately, all collective cooperation within and between parties in building projects stems from individuals. However, to date research in this area has focused on the organizational-level. For example Cooke-Davies (2001), Phua and Rowlinson (2004a), Kuo and Kuo (2010), and Eriksson and Westerberg (2011) examined the impact of cooperation between firms on project performance, while Ruan *et al.* (2012), Fu *et al.* (2015), Keung and Shen (2017), and Hietajärvi

and Aaltonen (2018) investigated the antecedents of inter-organizational cooperation. While these studies using the organization as the unit of analysis shed useful light on collective cooperation in the sector, no research to date has focused on the individual-level and how collectively cooperative or otherwise individuals attracted to work in the built environment are in the first place.

In this paper we seek to make a novel contribution in four ways. First, we use the individual rather than organization as the unit of analysis. Second, we examine the degree to which those attracted to occupations in the built environment are themselves individualists or collectivists. Third, we apply a nuanced psychological conceptualization of the individualist and collectivist personality types that makes a distinction between vertical and horizontal forms of each, and show that the particular mixture of personalities attracted to the industry may actually heighten levels of conflict. And fourth, we investigate the interactive effects of these personality types with gender, and show how the gender-based personality differences we observe may be exacerbating both the industry's high-levels of conflict and low female participation rates.

Individualism and collectivism constructs

The personality constructs of individualism and collectivism (I/C) which we address in this paper are universally applicable across populations and are regarded as one of the most widely used frameworks for characterizing and examining cultural differences pertaining to how individuals define themselves and their relationships with others in the social contexts to which they belong (Brewer and Chen 2007, p. 133). The conceptualization and measurement of the I/C construct in the psychology and personality literature have revealed the existence of two fundamentally different types of self: individualist (independent) or collectivist (interdependent) (Schwartz 1990, Markus and Kitayama 1991, Triandis 1995). An individual's I/C orientation affects the relationality of personal to collective interests and goals, individual discretion for action, locus of decision-making, emotional dependence on the collective, identity based in the social group, and emphasis placed on belonging (Brewer and Gardner 1996, Oyserman *et al.* 2002) and to a greater extent than other dimensions of personality influences the degree to which individuals cooperate with each other (Triandis 1989, Wagner 1995).

Drawing on the I/C dimension as an individual-level personality construct, this paper is directly addressing the call made by Phua (2013) on the need for construction management research to place more attention on studying the individual-level effects of culture. Here, a clear conceptual distinction needs to be made between treating individualism and collectivism as national cultural dimensions in the tradition of Hofstede's (1980) work on the one hand, and operationalizing it as individual-level constructs based on the work of researchers like Hui (1988) and Triandis (1995) on the other. Researchers such as Shenkar (2001), Sivakumar and Nakata (2001) and McSweeney (2002, 2009) have long contested the conceptualization of 'whole', distinct cultures between countries (e.g. Hofstede 1980, Kogut and Singh 1988) and have questioned the plausibility of ascribing stereotypical characteristics to countries based on Hofstede's framework as reducing national culture to a simplistic four-factor dimensional model masks variance within national cultures that exists across different organizational and individual levels (Oyserman *et al*. 2002). Kirkman *et al*. (2006) stated that empirical evidence of variance across levels is commonly found in mainstream cross-cultural literature even when researchers focus on the same outcomes, such as for example, at the individual-level, collectivism is positively related to job satisfaction but at the country-level, the opposite is true (p. 308). In this paper, the use of Hofstede's national cultural dimensions is conceptually and methodologically inappropriate because we are interested in analysing the individual-level variance that exists in otherwise conventionally accepted classifications of national cultures and where such variance can be best examined by conceptualizing the individualist and collectivist as individual-level personality constructs.

Practically, collectivists have been shown to exhibit greater preference for team working and team commitment (Kirkman and Shapiro 2001), increased avoidance of conflicts (Takahashi *et al.* 2002), and more cooperative and pro-social behaviors (Cox *et al.* 1991, Moorman and Blakely 1995). However collectivists' pro-social behaviours only apply to their in-groups. Towards out-groups - even within the same organization, collectivists have a greater tendency to exclude others and display greater discrimination and hostility than individualists (Leung and Bond 1984, Erez and Earley 1993). Individualists' lack of cohesiveness, by contrast, is a benefit when adapting to changing work environments and in fostering cross-organizational interaction (Workman 2001). Moreover as opposed to collectivists, individualists tend to actively pursue the resolution of conflicts rather than their avoidance (Ohbuchi *et al.* 1999, Takahashi *et al.* 2002).

Horizontal and vertical distinctions

Empirical work has further refined the I/C constructs into a 'horizontal' and 'vertical' (H/V) dimension, which reflects whether the concept of self is viewed as equal or potentially unequal to others (Triandis 1995, Triandis and Gelfand 1998). Singelis *et al*. (1995, p. 240), argued that this refinement improves the overall theoretical and empirical robustness of the more general constructs of I/C as it can account for much of the behavioural variation observed within individualist and collectivist groups. In particular, horizontal individualism conceives the self as an autonomous individual and yet stresses equality, while vertical individualism also conceives the self as an autonomous individual but accepts inequality. On the other end of the spectrum, horizontal collectivism perceives the self as a part of the collective, but sees all members of the collective as the same - thus equality and universalism are strongly emphasized, whereas vertical collectivism perceives the self as a part of a collective and is accepting of inequalities within the collective.

Conceptually this H/V distinction is thought to be important because it brings out the subtle nuances of the I/C constructs which are often treated as polar opposite cultural and personality dimensions (Triandis and Gelfand 1998). The horizontal dimension emphasizes universalism and equality, whereas the vertical dimension emphasizes hierarchy, power, and achievement. For example, an individual with horizontal orientation, stresses equality whereas those with vertical orientation accept inequality and the privileges of rank (Triandis 1995, p. 44). This distinction can be used to make predictions on many attributes, such as conformity, persuasion, leadership, conflict and justice, group processes and gender, and thus facilitates a richer account when it comes to explaining, for instance, why "American individualism is different from Swedish individualism; likewise, the collectivism of the Israeli kibbutz is different from Korean collectivism" (Triandis and Gelfand 1998, p. 119). Both horizontal and vertical individuals seek relationships which conform to their respective H/V orientations, and where possible will attempt to 'convert' relationships to their most desired form (Triandis 1995, p. 164). Individuals with vertical orientation are also most comfortable in competitive situations, while individuals with horizontal orientation will tend to reject or minimize competition, especially in social situations (Triandis 1995, p. 164).

Thus combined with the I/C constructs, four fundamental types of self can be categorized on the H/V-I/C spectrums: horizontal individualism (equal/independent), horizontal collectivism (equal/interdependent), vertical individualism (hierarchical/independent), and vertical collectivism (hierarchical/interdependent) (Singelis *et al.* 1995,

Triandis 1995). Conceptual merit aside, these four typologies will to some extent ameliorate the measurement problem associated with the way in which researchers tend to treat individualism and collectivism primarily only in their horizontal forms, thus limiting the variance of the constructs (Triandis and Gelfand 1998). It is with these advantages in mind that the current study will adopt the combined H/V-I/C dimensions in terms of its proposition development.

Research propositions

As previously stated, the aim of this study is to investigate the predisposition for cooperative behaviour of individuals who are attracted to work in the built environment with particular focus on the construction management and architecture subsectors, and the relationship between these individuals' H/V-I/C orientations and gender. As far as we know, there has been no previous research on the built environment sector directly considering its occupational attractiveness with respect to these personal attributes or how these in turn might affect the level of cooperation within the sector. However, some related research in the literature has provided useful basis for developing our research propositions. While numerous researchers have highlighted the problems of gender imbalance in the construction industry (e.g. Agapiou 2002, Clarke and Gribling 2008, Ness 2011), there has been little study to examine if this phenomenon is influenced by the perceived occupational attractiveness of the sector between males and females. One notable exception is a recent study by Phua (2017) of occupational attractiveness across several built environment subsectors where it was found that males are more attracted to the construction management subsector than females, while architecture showed no difference between genders. Despite Phua's somewhat unexpected findings for the architecture subsector, we might still expect to see male-bias in the attractiveness of both the construction management and architecture subsectors as there is well-documented evidence in the literature which shows architecture to be male dominated (e.g. Adams and Tancred 2000, Caven 2006). Hence we propose that;

P1. Male gender will positively predict the occupational attractiveness of construction management

P2. Male gender will positively predict the occupational attractiveness of architecture

In construction, Ankrah and Langford (2005) observed that contractors were distinguished by characteristics in line with vertical collectivism such as; hierarchical and tight in-groups, a preference for team-working, and deference to the

collective and objectives of the organization (p. 604). Similarly, Giritli and Civan (2008) found that civil engineers also displayed characteristics indicative of collectivism, but by contrast Akiner and Tijhuis (2007) observed traits associated with individualism. Since both contractors and civil engineers could be broadly considered to belong to the construction management subsector (Brown and Phua 2011, p. 86), we might therefore expect to see individuals attracted to the subsector with both vertical and either individualist or collectivist orientations. However, given construction management's reputation for favouring in-group networks and high levels of conflict – both of which are indicative of collectivism (see Dainty *et al.* (2004) and Phua and Rowlinson (2004b), respectively), on balance we might anticipate vertical collectivist orientations to predominate in those attracted to the industry. Hence we suppose that;

P3. Vertical collectivism will positively predict the occupational attractiveness of construction management

By contrast architects appear to exhibit characteristics most consistent with horizontal individualism, such as a relative lack of hierarchy and in-groups, the partitioning of work to individuals rather than teams, and the desire to incorporate their organization into personal identities (Ankrah and Langford 2005, p. 604). That architects may possess a horizontal orientation is further supported by Caven and Diop (2012) who find that they are less interested in rewards related to power, status, and recognition. Similarly, individualist personality traits are also ascribed to architects by Akiner and Tijhuis (2007), Ding *et al.* (2007) and Giritli and Civan (2008). Hence we postulate that;

P4. Horizontal individualism will positively predict the occupational attractiveness of architecture

Since we predict a positive influence of vertical collectivism and male gender on the occupational attractiveness of construction management, we might also anticipate a possible interaction between these two variables. Our speculation here is lent support by the fact that males appear to have a greater predisposition to define their identities in relation to their careers within construction (Ness 2011). Since collectivist men also define their sense of self to a greater degree with respect to their social and work relationships, the separate proposed effects of a vertical collectivist orientation and male gender in construction management may combine to produce an interaction on occupational attractiveness. Hence it is plausible that;

P5. The interaction of vertical collectivism and male gender will positively predict the occupational attractiveness of construction management

In architecture our proposed effects on occupational attractiveness of horizontal individualism and male gender may also interact. Such an interaction could arise, for instance, due to individuals viewing architecture as a profession which combines creative and spatial activities, which both individualists and males appear to excel at (Linn and Petersen 1985, Triandis 1995, p. 175, Jung and Avolio 1999, Furnham and Bachtiar 2011, Stoltzfus *et al.* 2011). Hence we propose that;

P6. The interaction of horizontal individualism and male gender will positively predict the occupational attractiveness of architecture

Methods

Whilst cross-cultural characteristics have been found to affect survey response styles (e.g. Harzing 2006, Hoffmann *et al.* 2013), this aggregate national difference in response style is only apparent in studies which adopt the country as the unit of analysis that mirror Hofstede's (1980) country-level cultural dimensions. In this current study, this is not deemed to be an issue because the unit of analysis is the individual and all the respondents are drawn from a single country (i.e. UK) (Earley 1993, 1994). Instead, the more commonly present problem of method variance in self-reported surveys (Spector 2006) is attenuated in this study by adopting steps that are described below.

Participants and procedure

To enhance the representativeness of our responses we sought to sample a broad cross-section of the working age population. We also sought to eliminate potential confounding effects of national culture by confining our sample to a single country (see Gudykunst *et al.* 1992, Earley 1993, 1994). Accordingly, a sample of 2000 was drawn from a larger and broad sample of United Kingdom citizens who had volunteered to assist with scholarly research. Using random number seeding for cases, we sought to derive a random but stratified sample. We specifically sought to obtain a sample with a balance between those already working and those still students yet to enter the workforce so we could control for potential effects of occupational experience on occupational attractiveness propensity. We also sought a balanced sample in terms of

sex, education and age. Hence, procedurally, we ensured that half our sample already worked, that half of those in each of the two respective worker/student cells were male, and that half of both males and females in each of the four subsequent cells had tertiary education, and that in each of the subsequent eight cells a reasonable cross-section of ages was represented.

An online English language instrument was designed, pilot-tested and then administered by email. An initial administration was followed-up by a reminder one month later, producing a final sample of 602 fully completed responses. After eliminating respondents who stated their occupation as retired or full-time housewife/ husband, our useable sample was 548. While this represented a respectable response rate of around 27% from our original sample, we nevertheless tested for potential unit non-response bias using Armstrong and Overton's (1977) procedure for comparing early and late responders. We found no significant differences between initial and reminder emailing respondents with respect to age (χ^2 = 11.16, p = 0.52), sex (χ^2 = 0.08, p = 0.77), education (χ^2 = 0.02, p = 0.88), or occupation (χ^2 = 0.14, p = 0.69), suggesting unit non-response bias is not manifestly evident in the obtained sample.

Measures

Dependent variables

To ensure respondents had a reasonably uniform and accurate conception of each occupation, succinct and deliberately anodyne lay descriptors for each were given prior to assessing occupational attractiveness (e.g. architecture is the design of buildings). We followed Courtright and Mackey (2004) in assessing occupational attractiveness by using a continuous measure. However, unlike these researchers, we did not use a single item, but instead used a 5-item scale to obtain higher validity and reliability. Sector occupational attractiveness was assessed for, respectively, the construction management and architecture subsectors with a question whose stem asked: '*Regardless of your current occupation, how true for you personally is it that a career in the (sector name) sector would be* …?' Five items then followed: *Unpleasant, Enjoyable, Unattractive, Desirable and Dislikable*. The mixed positive and negative valences of items were designed to reduce response set and acquiescence responding (Knowles and Nathan 1997). These items were answered on a 6-point interval measure running: *Very Untrue, Untrue, Slightly Untrue, Slightly True, True, Very True*. Asking respondents to think about the 'career attractiveness' rather than merely the 'attractiveness' of the subsectors would imply that respondents are likely to consider the occupational attractiveness of the subsectors at, at least the professional entry level. To help

reduce method variance, questions for each sector were dispersed throughout the instrument rather than presented as a block (Spector 2006). Negatively valenced items were reverse-coded and a summated mean was then derived for each occupation. The Cronbach's alphas for internal consistency reliability of each sectors' occupational attractiveness are: construction management α .85 and architecture α .83.

Independent variables

As the basis for our H/V-I/C measure we drew upon Triandis and Gelfand (1998). The scale has been widely validated through the replication of its use to examine individual H/V-I/C effects in hundreds of cross-cultural and organizational studies. In this study, we used the original scale developed by Triandis and Gelfand (1998) rather than some other subsequent variants in order to preserve the reliability of the scale. However, the original scale exhibits slightly sub-optimal internal consistency reliability, and so, in line with Cronbach's (1951) suggestion to improve the interrelatedness of the scale items we added two items from Nelson and Shavitt (2002) to the end of each of the four H/V-I/C subscales. This combined scale was further adapted through pilot testing to improve ease of comprehension and utility before distributing it to the general population, and is presented in the Appendix. These adjustments successfully enhanced internal consistency reliability, with Cronbach's alpha for each measure, respectively, HI .82, VI .81, HC .86, VC .82.

To reduce the effect of 'middle response style' we follow the recommendation proposed by Harzing *et al.* (2009), by including a 7-point interval measure extending from Strongly Disagree to Strongly Agree which was administered with the following question stem: How much do you agree/disagree with the statements below:-. In the instrument each block of H/V-I/C items was separated by various other scales, with a minimum of two dozen questions between each block.

Control variables

Age

Degree of I/C orientation has been demonstrated to differ by age (Earley *et al.* 1999, Wagner 1995). Accordingly, we controlled for age. Due to the reluctance of some people to give their exact age, rather than lose usable responses through item non-response we measured age in categories of 5-year blocks that are less off-putting to complete. Mode age category for our sample is 25-29 years (32.3 percent), with 29.2 percent aged 20-24 years, 12.6 percent 30-34 years, 6.9

percent 35-39 years, 17.9 percent in the 5-year categories between 40 and 69 years, with the remaining 2.2 percent 15-19 year-olds. These categories were coded from 1 to 11 and thereby provided a continuous measure for age based not on 1-year age intervals, but on 5-year intervals. This meant eliminating the 15–19 year-old category to ensure comparable year-spans in each category, so our sample thereby reduced by 6–548.

Sex

Prior research on the effect of sex on I/C orientation finds support for differences between males and females (Lykes 1985, Singelis *et al.* 1995). Hence we controlled for sex, with our dummy coded 1 for males. Our sample comprises 55.8% females.

Education

Level of formal education is commonly controlled in I/C studies (Farooq *et al.* 2017, Lykes 1985,). Accordingly we controlled for education level. We collected data on highest level of educational attainment, and collapsed bachelor, master and doctoral degree qualifications into a tertiary/non-tertiary education dummy, with tertiary education attainment coded 1. Reflecting our efforts to draw a sample comprising a balance between those with and without tertiary education, some 48.5% of our final sample has attained a tertiary education qualification.

Student

We wanted to control for possible effects on occupational attractiveness of having already entered the workforce. Therefore, we asked respondents to give their current occupations in order to create a dummy variable for students/non-students (and to eliminate retirees/house-wives/husbands). Non-students comprise 54% of our final sample, and of these 21.3% were public sector employees, 23.6 % private firm employees, 9.2% self-employed/business owners, and the remainder unemployed. The student dummy is coded 1.

Social desirability

We controlled for social desirable response bias using a shortform of Crowne and Marlowe's (1960) measure developed by Strahan and Gerbasi (1972) and refined by Thompson and Phua (2005). Similarly to these latter researchers, we find the scale's Cronbach's alpha of internal consistency reliability to be modestly acceptable at .67.

Analyses and Results

Table 1 presents descriptive statistics and the inter-variable correlations between subsector occupational attractiveness, the controls, and H/V-I/C orientation variables. Table 2 sequentially shows hierarchical regressions on occupational attractiveness with the controls, main H/V-I/C variables, and finally interactions with gender.

Table 1 here

Table 2 here

Main effects

Table 2 presents the first models for both construction management (Model 1) and architecture (Model 4) with only the control variables are entered, showing that construction management is more attractive to males whereas architecture shows no gender preference. Thus proposition P1 finds support but P2 does not.

Models 2 and 5, respectively, enter the main H/V and I/C effects into construction management and architecture. Model 2 shows that the occupational attractiveness of construction management is greatest for individuals at opposite ends of the H/V and I/C spectrums: specifically, horizontal individualists and vertical collectivists. Therefore P3 is partly supported, with the additional unexpected result that horizontal individualists are also attracted to the sector. For architecture, Model 5 shows that only horizontal individualists have a preference for the profession. Hence, P4 is supported.

Interactions

Models 3 and 6 add interactions between the main H/V-I/C effects and gender. Model 3 shows that for construction management, horizontal individualism is a gender-independent predictor of occupational attractiveness, but that the vertical collectivists attracted to the industry are predominately male. It is worth noting that this interaction effect at 0.46 is substantially larger than the combined effects of vertical collectivism and gender entered separately in Model 2, which are 0.13 and 0.15 respectively. Moreover this effect strips the independent influence of sex. Thus P5 finds support. This interaction effect is depicted in Figure 1.

Figure 1 here

Model 6 shows that, similar to construction management, horizontal individualism is also a gender-independent predictor for the occupational attractiveness of architecture, and has no interactions with gender. In this case however, vertical individualism is additionally positively associated with attractiveness when interacted male gender. In fact, the magnitude of this interaction effect at 0.37 is also substantially larger than the effect of horizontal individualism alone at 0.17. Thus P6 is unsupported. This interaction effect is illustrated in Figure 2.

Figure 2 here

Taken together, the results in Models 3 and 6 show that the only H/V-I/C predictor of occupational attractiveness not preferentially associated with males is horizontal individualism. Therefore, the females primarily attracted to the construction management and architecture subsectors will tend to exhibit this horizontal individualist orientation. In addition, 'vertical-ness' seems to be a predictor of occupational attractiveness across both subsectors for males only, whereas there does not exist an I/C association with gender that is common to both subsectors.

Discussion

The results present mixed support for the research propositions with P1, P4, and P5 supported, P3 partially supported, and P2 and P6 unsupported. The result for P3 that horizontal individualists in addition to vertical collectivists are attracted to construction management is perhaps not surprising since Akiner and Tijhuis (2007) had previously noted that some professionals in the subsector (civil engineers) exhibited more individualistic orientations, and stated that this was particularly the case for the professional- and management-level positions we targeted in our sample. This suggests there may perhaps be variation in construction management H/V-I/C orientations according to specific work functions and roles.

The unsupported result for P2 that there was no male-bias in the occupational attractiveness of architecture was contrary to expectations and does not correspond with the actual low levels of female employment in the subsector. A possible explanation for this discrepancy is indicated in the research of De Graft-Johnson *et al.* (2005), who note that while the proportion of architecture students who are female is relatively high at 37%, over two thirds of them leave the

profession after qualifying. Furthermore, those females who remain in the architecture profession report lower job satisfaction and higher turnover intentions than their male counterparts (Sang *et al.* 2007). Therefore, while in general females seem to initially possess a relatively favourable impression of working in architecture, this perception may be at odds with experiential reality. Since we do not restrict our sample to respondents currently employed in the architecture subsector, the results we obtain for females should also more closely reflect that of the general population as opposed to architecture employees specifically, which may thus account for P2 being unsupported. The lack of support for P6 in finding no interaction in the occupational attractiveness of architecture between horizontal individualism and male gender may perhaps at least partly reflect the fact that males generally tend to exhibit more vertical rather than horizontal values (Spence and Helmreich 1978, Triandis 1995).

Conflict

The findings of this study have potentially important ramifications with respect to understanding the causes of the intra- and inter-organizational conflict habitually experienced in the built environment. Results show that construction management subsector appears to simultaneously attract individuals from opposite ends of both the H/V and I/C spectrums: horizontal individualists on the one hand, and vertical collectivists on the other. This polar combination of values has the potential to generate conflict both within and between construction organizations (Cartwright and Cooper 1989, Swierczek 1994, Pelled *et al.* 1999, Balthorpe *et al.* 2000, Workman 2001, Phua and Rowlinson 2003). For instance, co-working among colleagues with different I/C orientations is associated with communication difficulties (Triandis 1967), clashes in co-worker goals and expectations (Ankrah and Langford 2005), and conflicting preferences for individual- versus team-working (Earley 1993). The architecture subsector on the other hand, preferentially attracts individualists only (both horizontal and vertical), indicating that architecture appeals to somewhat more compatible sub-populations. Nevertheless, the differences in H/V-I/C orientations identified *across* construction management and architecture (VC vs VI) could also represent a significant source of the frequent disputes noted between them in the project environment by Rameezdeen and Gunarathna (2003).

Gender imbalance

The interaction results show that the H/V-I/C compositions of those attracted to the construction management and architecture subsectors appears to be at least partially determined by gender. This effect appears most pronounced in construction management, where horizontal individualism is equally associated with males and females, but vertical collectivism is primarily associated with males. The correlation between males and collectivism in construction management subsector is perhaps not surprising when one considers the tight in-group relations which characterise the industry (Baarts 2009). The upshot of this association is that, in common with collectivists generally, males may excessively discriminate against out-group members (Triandis 1967, 1995, p. 176, Erez and Earley 1993, p. 80), thereby hindering effective cooperation with out-group teams and organizations (Phua and Rowlinson 2003, 2004b). That the results show that women who are attracted to the industry are primarily individualist, suggests that they may indeed be better suited to fostering cooperative relations with project team members and external organizations than previously recognized. Evidence also suggests that when conflicts (whether H/V-I/C-based or otherwise) inevitably do arise, female managers may be better at proactively resolving such conflicts than males (Heavey *et al.* 1993, Portello and Long 1994, Brewer *et al.* 2002). Therefore as previously asserted by Gale (1992) and Loosemore and Galea (2008), increasing the participation of women in construction may represent an untapped opportunity to address the industry's additional long-standing needs of improving inter-organizational cooperation and decreasing levels of conflict.

Implications for practice

Compounding the fact that men and women attracted to the built environment industry tend to possess differing H/V-I/C orientations, research additionally indicates that women may experience difficulties arising from these differences more acutely than men (Rose and Cartwright 1994, Cartwright and Gale 1995). Therefore, as many other authors have claimed, addressing the gender-based mismatch of personal values in the built environment may be the key to rebalancing the low participation rates of women in the industry (e.g. Dainty *et al.* 2000, Byrne *et al.* 2005, De-Graft Johnson *et al.* 2005, Hossain and Kusakabe 2005).

Since women attracted to the construction management and architecture subsectors appear to exhibit horizontal individualist orientations, in order to retain them organizations should more actively promote and instil horizontal

individualist management practices such as: downplaying status differences between colleagues, emphasizing equality, promoting individual work, allowing for more fluid work teams, and implementing financial incentive schemes that reward individual action and accomplishment (Erez and Earley 1993, p. 90). Furthermore, organizational HRM policies should be directed to help women become part of 'collectivist men's' in-groups, and to assist individualists in working effectively with collectivists by, for instance; using more qualifiers, disclaimers, and tentative language, increasing sensitivity to group dynamics, being proactive in addressing low-grade conflict before it escalates, but letting go of conflict situations if the other party is not able to deal with it directly (Triandis *et al.* 1988, Ting-Toomey 1994). To this end, CM researchers have established that HRM practices and policies can to some degree ameliorate the gender imbalance issue through better approaches to recruitment, remuneration, and training (Langford *et al.* 1995, Dainty *et al.* 2000, Loosemore *et al.* 2003, Chan and Dainty 2007). What would be useful is to utilise the findings from this study to improve the attractiveness of the industry to both potential male and female recruits through the adoption of more coherent and yet, socially nuanced HRM practices across the board. To this end, it might be deemed necessary that male and female recruits and employees require different approaches to recruitment, and training and development. For example, in terms of person-job-fit, HRM practices that closely match the broad values that individuals intrinsically relate to tend to generate positive job attitudes and better job satisfaction (Ramamoorthy *et al.* 2005, Brewster 2007). These in turn, tend to translate into improved organizational outcomes through better employee recruitment, retention, and performance. Implemented and followed-through thoughtfully and systematically by the multiple industry stakeholders, these HRM practices ought to bring about better organizational efficiency than the piecemeal and ad-hoc practices which are still commonplace within the industry.

Implications for research

As urged by Phua (2013), our results suggest that 'culture' in the aggregate national form that it is predominantly adopted in CM research needs to be reconsidered at the individual level in conjunction with a range of moderating factors in order to reveal subtle but important relationships between variables. As Bresnen (2009) points out, because project organizations differ in their social, technical, and institutional configurations, the characteristics of the individuals and teams that make up these projects are similarly expected to vary. Specifically, research at the individual-level of analysis is needed to advance our current understanding of the relationships between management techniques, cooperation, individual

behaviours, and critical project performance issues. Studying these variations should go beyond comparing the effects of obvious demographic differences such as age, gender, work experience or nationality. Because individual agency and behaviour are inherently shaped by the way individuals ascribe meanings to events and how they enact their social world, individual-level attributes are crucial in the analyses of project performance, and in this particular research context, how they indeed perceive the occupational attractiveness of the industry. A potentially conducive avenue for future CM research would be to give more scholarly attention to ways in which the industry and its respective subsectors attract the 'ideal' candidates for employment and retention. This is a critical endeavour, especially when we now increasingly recognise that project and organizational performance such as safety, decision-making, and leadership are shaped more by the individuals within it than the processes and procedures enacted by projects and organizations, and the countries in which they happen.

This study also examined just one of possibly multiple individual personality traits relevant to the built environment. Future research might reveal that other personality dimensions such as power distance, masculinity, uncertainty avoidance proposed by Hofstede (1980) or Trompenaars (1993) are also applicable to developing a more complete picture of the individuals attracted to the built environment, and the possible implications this may have on outcomes relevant to the industry.

Still further, the hypothesised challenges in the built environment with respect to cooperation arising from the mismatch of H/V and I/C orientations, though theoretically consistent, remain empirically untested. This distinction may be important as Winch *et al.* (1997), for instance, have found that theoretically predicted effects of personality differences do not always manifest as expected. On this point there may, for instance, exist important variables which moderate the magnitude of H/V-I/C effects on projects, firms, and the built environment more generally. Moreover, examination of specific combinations of individuals' H/V-I/C orientations within the project environment may yield significant relationships. Ankrah *et al.* (2009) and Baarts (2009), for example, have previously suggested this may be the case, and as research has shown that the personality of certain key leaders within organizations can have disproportionate effects on the organization as a whole (Kets de Vries and Miller 1986), future research might therefore investigate the effects of mixing different combinations of individuals possessing different H/V-I/C orientations – perhaps taking account of seniority – within specific built environment subsectors.

Beyond the built environment, future analyses of personality in other industries such as mining, transportation, utilities, and healthcare may provide further insight into individual-level root causes of their gender imbalances and organizational frictions, and consequently also offer needed guidance for their improvement. While some of the gender-specific variation in personality attributes may be mutable and therefore malleable to external influence, studies have also argued that significant genetic (Plomin *et al.* 1994, Jang *et al.* 2002, Yamagata *et al.* 2006), cultural (Triandis and Suh 2002, Allik and McCrae 2004, Hofstede and McCrae 2004), and certain environmental (Huntington 1945, Watsuji 1961, Demeo 2006, Rentfrow *et al.* 2008) antecedents of personality are essentially fixed. This would imply that in trying to modify the corporate culture of, for instance, the built environment towards horizontal individualist values more conducive to attracting women, the process of this endeavour will require a long-term horizon and perhaps the eventual (and radical) replacement of current workers with those whose intrinsic values are more aligned with progressive goals.

Limitations

While the conclusions of this study are appropriate given the data and methodology, there are some limitations to note. The dataset was collected from a single country sample, which although deliberately ameliorating issues related to cross-national variation, potentially limits the generalizability of our results. Further, we address only two specific built environment industry subsectors. Future research could therefore examine a broader international sample and incorporate other subsectors struggling with issues potentially related to H/V-I/C orientations and gender imbalance. Such research could even profitably decompose construction management and architecture into their specific organizational functions for more nuanced analyses. In particular, this research only investigated individual differences in the occupational attractiveness of construction management and architecture for professional/management-level positions. It might well be the case that more senior positions in the organization retain individuals with different H/V-I/C orientations, and their interactions with more junior staff may be influenced by their differing statuses.

Conclusion

The application of social psychology constructs and organizational theory to the built environment industry is still at an early stage, particularly at the individual-level of analysis. Addressing this shortcoming, this research examines the

extent to which the construction management and architecture subsectors are differentially attractive to males and females with respect to horizontal and vertical (H/V) individualism and collectivism (I/C), and hence, sheds some light on our understanding of the problem of lack of cooperation and female underrepresentation in the industry. We find that the construction management subsector simultaneously attracts horizontal individualists and vertical collectivists, but that vertical collectivists are more likely to be male. The architecture subsector by contrast attracts individualists only – both horizontal and vertical, while its vertical individualists are more likely to be male. These effects on construction management and, to a lesser extent the architecture subsectors may represent an important, and yet, unrecognised source of intra- and inter- organizational conflict and gender imbalance. Specifically, that women attracted to the construction management and architecture subsectors generally possess individualist orientations suggests that greater female participation could help address the industry's long-standing need to increase cooperation and reduce levels of conflict within and between firms.

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Appendix

Horizontal-Vertical Individualism-Collectivism Scale

Horizontal individualism items:
I'd rather depend on myself than others
I rely on myself most of the time; I rarely rely on others
I often do "my own thing"
My personal identity, independent of others, is very important to me
What happens to me is my own doing
I enjoy being unique and different from others in many ways

Vertical individualism items:
It is important that I do things better than others
Winning is everything
Competition is the law of nature
When another person does better than I do, I get tense and annoyed
I enjoy working in situations involving competition with others
It irritates me when other people perform better than I do

Horizontal collectivism items:
If a friend gets a prize, I would feel proud
The well-being of my friends is important to me
To me, pleasure is spending time with others
I feel good when I cooperate with others
I think cooperation in the workplace is more important than competition
I enjoy doing things with people like me

Vertical collectivism items:
Parents and children must stay together as much as possible
It is my duty to take care of my family, even when I have to sacrifice what I want
Family members should stick together, no matter what sacrifices are required
It is important to me that I respect the decisions made by my groups
I would do what would please my family, even if I detested that activity
I would sacrifice something I enjoyed if my family did not approve of it

Table 1. Descriptive statistics and inter-variable correlations

				Pearson product moment correlations									
		Mean (%)	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Occupational attractiveness of:												
1.	Construction management	2.59	1.25										
2.	Architecture	3.18	1.19	.50 ***									
	Controls												
3.	Age	5.51	2.53	.04	.10 *								
4.	Sex	(44)	.50	.17 ***	-.02	.02							
5.	Student	(46)	.50	-.10 *	-.07	-.27 ***	-.04						
6.	Education	(85)	.36	.00	.04	.08	-.03	-.07					
7.	Social Desirability	3.30	.56	-.05	-.02	-.13 **	.06	.01	-.04				
	Main effects												
8.	Horizontal individualism	5.44	.98	.13 **	.13 **	.05	.02	.04	-.01	.01			
9.	Vertical individualism	3.96	1.18	.07	-.01	-.18 ***	.17 ***	-.03	.00	.22 ***	.17 ***		
10.	Horizontal collectivism	5.80	.92	.03	.09 *	-.08	-.17 ***	.12 **	-.01	-.12 **	.35 ***	.00	
11.	Vertical collectivism	4.59	1.11	.18 ***	.10 *	.06	.11 *	-.05	-.03	-.05	.26 ***	.18 ***	.25 ***

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$. Sex dummy coded male 1.

Table 2. Regressions showing main effects and interactions with sex predicting occupational attractiveness of construction management and architecture

	Construction management						Architecture					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β
Controls												
Age	.02	.00	.02	.00	.02	-.01	.02	.08	.02	.07	.02	.06
Sex	.11	.17 ***	.11	.15 ***	.84	-.03	.10	-.03	.11	-.02	.81	-.50
Student	.11	-.10 *	.11	-.09 *	.11	-.09 *	.11	-.05	.11	-.06	.11	-.05
Education	.15	.00	.15	.00	.15	.01	.14	.03	.14	.03	.14	.04
Social Desirability	.09	-.06	.10	-.06	.10	-.06	.09	.00	.09	.01	.09	-.01
Main effects												
HI (horizontal individualism)			.06	.09 *	.08	.12 *			.06	.10 *	.08	.17 **
VI (vertical individualism)			.05	.02	.06	-.02			.05	-.02	.06	-.11
HC (horizontal collectivism)			.06	.00	.09	.01			.06	.05	.08	.00
VC (vertical collectivism)			.05	.13 **	.06	.05			.05	.07	.06	-.01
Interactions												
Sex X HI					.12	-.22					.11	-.45
Sex X VI					.09	.15					.09	.37 *
Sex X HC					.13	-.17					.12	.21
Sex X VC					.10	.46 *					.10	.40
R^2	.042		.076		.088		.013		.038		.059	
F Statistic	4.794 ***		4.896 ***		3.944 ***		1.456		2.386 *		2.564 **	
ΔR^2			.034 **		.046				.025 **		.046 *	

Notes. * p < .05, ** p < .01, *** p < .001. Betas standardized. Sex dummy coded male 1.

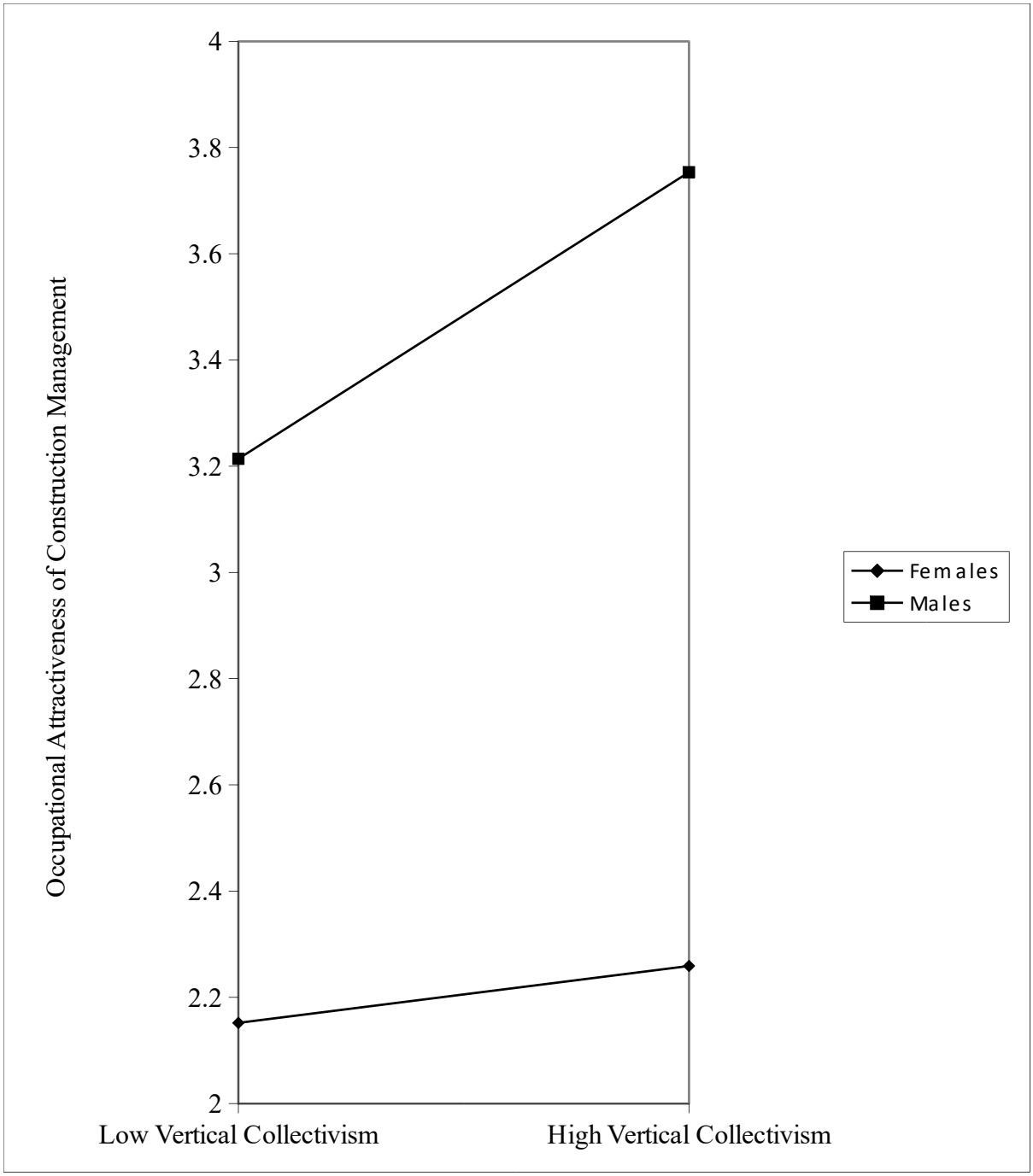

Figure 1. Interaction effect of sex and vertical collectivism on construction management's occupational attractiveness. Note: Low and high vertical collectivism are 1 SD, respectively, below and above mean.

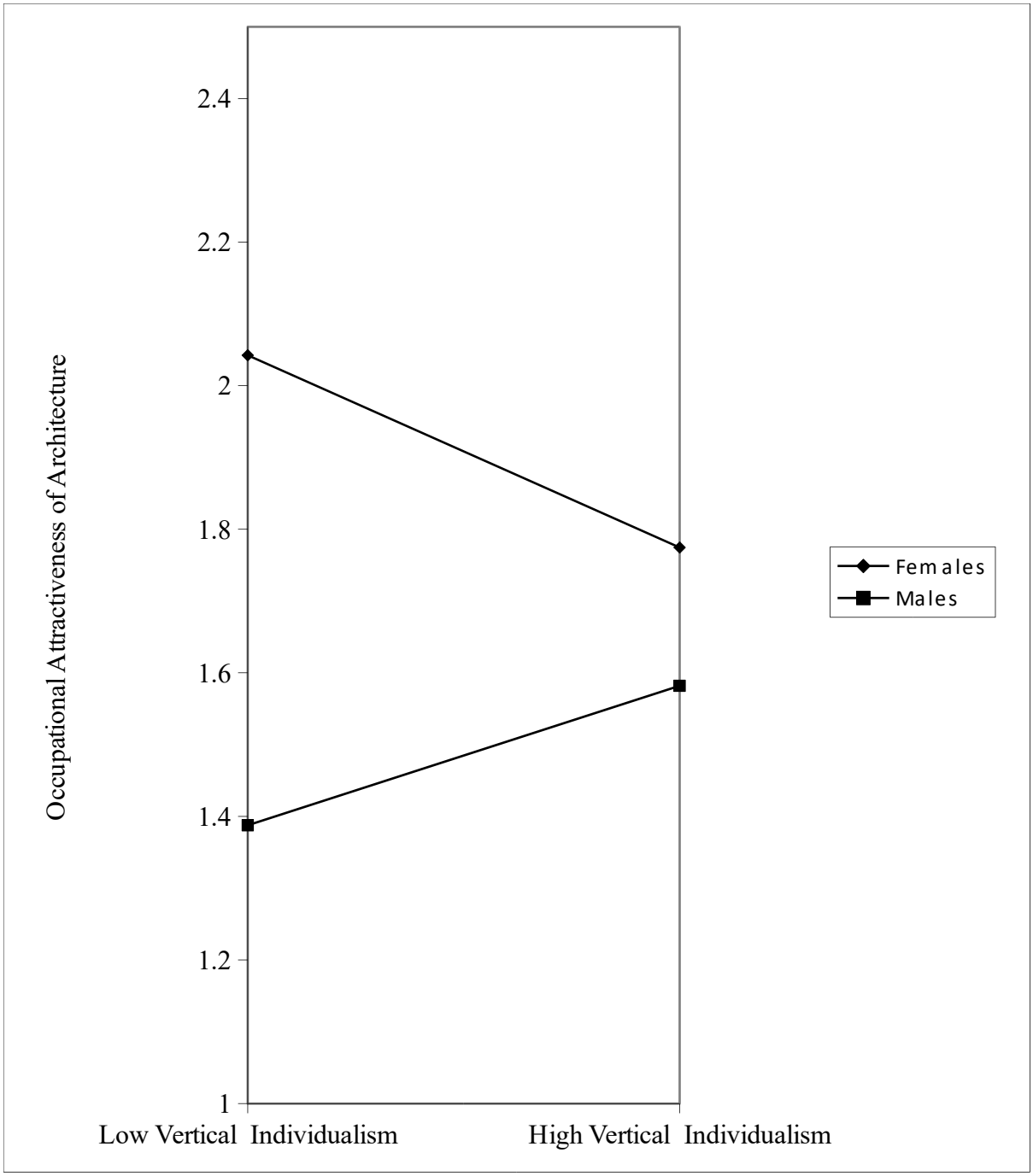

Figure 2. Interaction effect of sex and vertical individualism on architecture's occupational attractiveness. Note: Low and high vertical individualism are 1 SD, respectively, below and above mean.